

End-of-Topic Test Mark Scheme: Energy 1: Higher Levels

| Question | Level | Answer | Marks | Notes |
|----------|-------|---|-------|---|
| 1a) | 5 | Drawing the ammeter in the correct position (on either side of either bulb), in series (1 mark) and the symbol is correct (1 mark) | 2 | |
| b) | 5 | Brightness is less (1 mark) because the energy is shared between more bulbs/current depends on the number of bulbs in the circuit (1 mark) | 2 | |
| c) | 5 | Chemical energy from the cell (1) changes to light energy in bulbs (1). As energy transfers from the cell (1) to the surroundings (1) less energy is available for the bulbs (1) | 4 | Level 5 – 4 marks for at least four out of the five points |
| 2a) | 5 | Fossil fuel supplies last longer (1 mark). Wood is renewable, i.e. supplies can be grown in a relatively short time span (1 mark). Supplies can be grown close to point of use (1 mark). Cheap (1 mark) | 2 | Level 5 – 2 marks for any two reasonable points |
| b) | 5 | Four columns: fuel, start temp, finish temp, change in temp | 3 | 1 mark for 1st and 4th columns; 2 marks for including columns 2 and 3 (i.e. space for raw data); 1 further mark for drawing a table |
| c) | 5 | He does not say he controlled the variables (1 mark), e.g. amount of water or fuel (1 mark). He does not include results (1 mark). He may not have used the same method each time (1 mark). Any sensible point that shows that he did not carry out a fair test | 3 | Level 5 – any three points |
| 3a) | 6 | The freezer is colder than the fridge (1), so ice cream gains heat energy from the warmer surroundings in the fridge (1). The room is warmer than the fridge (1), so the tap water loses heat energy to the cooler surroundings in the fridge (1) | 4 | |
| b) | 6 | Two points out of: This reduces heat from the surroundings reaching the ice cream (1), newspaper reduces conduction (1), foil reduces convection (1) | 2 | |

| | | | | |
|--------|---|---|---|--|
| 4a) | 6 | Reduces use of non-renewable resources; will not run out; (1) reduces greenhouse gases; reduces acid rain (1) | 2 | |
| b) | 6 | Name of a renewable resource (1); why it is not reliable, e.g. solar energy/can't produce electricity at night or if it is cloudy (1) | 2 | |
| 5a) | 7 | Milk is mostly water which absorbs the microwaves (1) transferring energy to the molecules (1) | 2 | |
| b) | 7 | The milk is better at absorbing microwaves than biscuits (1) so it heats up faster (1) | 2 | |
| 6a) | 7 | Less energy is wasted (1 mark) so less fuel is needed to heat the home (1 mark) so fewer gases are emitted as the fuel burns (1 mark) | 3 | |
| b)i) | 7 | Warm wet air from kitchens/bathrooms is sent to the loft (1 mark) where it heats up fresh air using the heat exchanger (1 mark) and sent to bedrooms (1 mark) OR heat exchangers transfer unwanted heat from warm places in the home (1 mark) to other places that need to be heated (1 mark) | 3 | |
| b) ii) | 7 | Air gaps/vacuum between two layers of glass (1 mark) reduces the heat transfer through windows (1 mark) | 2 | |
| 7a) | 8 | Speed = distance/time = $1000/3$ (1) = 333.3 (1) m/s (1) | 3 | |
| b) | 8 | Time = distance/speed = $250/5000$ (1) = 0.05 (1) s (1) | 3 | |
| c) | 8 | Sound travels more quickly on rocks/pipes (1) Less energy dissipates as it travels along the solid (1) so the signal is stronger and more likely to be heard (1) | 3 | |

Level boundaries for complete test

| Mark | Level descriptor |
|-------------|-------------------------|
| 1-4 | Level 5 (weak) |
| 5-13 | Level 5 (secure) |
| 14-17 | Level 5 (strong) |
| 18-20 | Level 6 (weak) |
| 21-25 | Level 6 (secure) |
| 26-28 | Level 6 (strong) |
| 29-31 | Level 7 (weak) |
| 32-37 | Level 7 (secure) |
| 38-42 | Level 7 (strong) |
| 43-45 | Level 8 (weak) |
| 46-49 | Level 8 (secure) |